SOUTH DAKOTA MATHEMATICS STANDARDS GLOSSARY

*Note: This glossary contains explanations, not necessarily formal mathematical definitions of terms used in the standards document.

Absolute value A number's distance from zero on the number line. The absolute value of -4 is 4; the absolute value of 4 is 4; the symbol greater is |4|.

Acute angle An angle whose measure is more than 0° but less than 90°.

Algorithm An organized sequential procedure for performing a given type of calculation or solving a given type of problem. An example is long division.

Analog Having to do with data represented by continuous variables, e.g., a clock with hour, minute, and second hands.

Area The measure of a region of a plane, usually represented by the number of square units needed to cover a surface enclosed by a geometric figure.

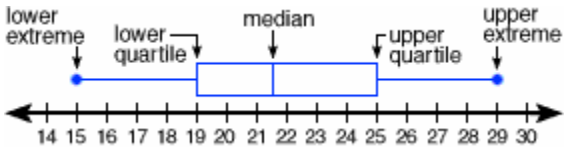
Arithmetic sequence A sequence of elements in which each term is the result of adding a fixed number to the previous term.

Associative property Allows numbers to be regrouped in an addition or multiplication problem, e.g., $a+(b+c)=(a+b)+c$; $ax(b\times c)=(a\times b)\times c$.

Axiom A basic assumption about a mathematical system from which theorems can be deduced. For example, the system could be the points and lines in the plane. Then an axiom would be that given any two distinct points in the plane, there is a unique line through them.

Bar graph A graph form using rectangular bars to summarize data; specifically to show how many observations fall into a particular category.

Box-and-whisker plot A graphical method for displaying the median, quartiles, and extremes of a set of data, using the number line.



Cartesian plane See coordinate plane.

Circle A set of all points in a plane that are the same distance from a given point in the plane.

Circumference Distance around a circle. The formula is $C = 2\Pi r$, where r is the circle's radius, or $C = \Pi d$, where d is the circle's diameter.

Closure property A set of numbers, such as the integers, is closed under a particular operation if performing the operation on numbers in the set results in another number in that set. For example, the set of non-zero integers is closed under multiplication, but is not closed under division.

Coefficient The numerical part of a term, e.g., 5 is the coefficient of the x^2 term in $5x^2 - 7$.

Combination A selection in which order is not considered.

Commutative property The property of a number system that provides for the reordering of terms in certain operations, such as addition and multiplication, e.g., $a + b = b + a$, $ab = ba$.

Compensation A mental math strategy in which one addend is changed to a multiple of 10 and then the other addend is adjusted to keep the balance, e.g.,

16+9	7 + 9
(16-1) + (9+1)	(7-1) + (9+1)
15+10 = 25	6 + 9 = 16

Complex number A number of the form $a + bi$ where *a* and *b* are real numbers and $i = \sqrt{-1}$.

Cone A three-dimensional shape in space that has a circular base and one vertex.

Congruent Geometric figures or angles that have the same size and shape. Two angles are congruent if they have the same measure. Two line segments are congruent in they have the same length. The symbol is $\cong$.

Conjecture An informed, educated guess.

Composite number A natural number greater than one that is not prime.

Conversion factor A numerical factor used to multiply or divide a quantity when converting from one system of units to another.

Coordinate plane A plane in which two number lines called coordinate axes intersect at right angles and are usually called the *x*-axis and *y*-axis. Every point in a coordinate plane can be described uniquely by an ordered pair of numbers, the coordinates of the point with respect to the coordinate axes.

Cosine The cosine of an angle (∂), cos(∂) is the *x*-coordinate of the point on the unit circle so that the ray connecting the point with the origin makes an angle of ∂ with the positive *x*-axis. When q is an angle of a right triangle, then cos(∂) is the ratio of the adjacent side to the hypotenuse.

Counting number A number used for counting objects, i.e., a number from the set {1, 2, 3, 4, 5,…}. The same as natural numbers.

Decimal number A numeral that contains a decimal point, such as 2.673.

Deductive reasoning A type of reasoning in which the conclusion about particulars follows necessarily from general or universal premises.

Difference The result of a subtraction.

Digit Any of the symbols used to write numbers, 0-9. The ten symbols, 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. The number 215 has three digits: 2, 1, and 5.

Digital Having to do with data that is represented in the form of numerical digits; providing a readout in numerical digits, e.g., a digital watch.

Dilation A type of transformation that is a proportional shrinking or enlargement of a figure.

Dimensional analysis A method of manipulating unit measures algebraically to determine the proper units for a quantity computed algebraically. For example, velocity has units of the form distance over time (e.g., meters per second [m/sec]), and acceleration has units of velocity over time; so it follows that acceleration has units $(m/\sec)/\sec = m/(\sec^2)$.

Distributive property A property of the number system in which multiplication distributes over addition represented by $a(b+c) = ab + ac$.

Domain The domain of a function is the set of possible values for *x*.

Elapsed time Difference between starting time and the ending time of an event.

Expanded form The expanded form of an algebraic expression is the equivalent expression without parentheses. For example, the expanded form of $(a+b)^2$ is $a^2 + 2ab + b^2$.

Expanded notation A way of representing a number that shows the sum of each digit multiplied by the appropriate positive power of ten and the units digit, e.g., 3451 as $3\times1000 + 4\times100 + 5\times10 + 1$ or as $3\times10^3 + 4\times10^2 + 5\times10 + 1$.

Exponent The number that indicates how many times the base is used as a factor, e.g., in $4^3 = 4 \times 4 \times 4 = 64$, the exponent is 3, indicating that 4 is repeated as a factor three times.

Exponential function A function commonly used to study growth and decay. It has the form $y = a^x$ with a positive value of a other than $a = 1$.

Factors Any of two or more quantities that are multiplied together, for example, 2 and 3 are factors of 6.

First degree expressions See linear expressions.

First degree equations An equation involving only first degree expressions.

Five number summary For a data set, the numbers representing the minimum and maximum values, first and third quartiles, and median.

Function A mathematical relation that associates each object in a set with exactly one value.

Fundamental counting principle If event M can occur in m ways, and after it has occurred, event N can occur in n ways, then event M followed by event N can occur m•n ways.

Geometric pattern A sequence of symbols or geometric figures.

Geometric sequence (progression) An ordered set of numbers that has a common ratio between consecutive terms, e.g., {1, 3, 9, 27, 81…}.

Histogram A vertical block graph with no spaces between the blocks. It is used to summarize data by representing the frequency of observations that fall within uniform intervals of values.

Hypotenuse In a right triangle the hypotenuse is the longest side which is opposite the right angle.

Identity property Adding zero to a number does not change the value. Multiplying a number by one does not change the value.

Independent event Two events in which the occurrence of one event does not affect the probability of the occurrence of the other.

Inductive reasoning The type of reasoning that uses inference to reach a generalized conclusion from particular instances.

Inequality A relationship between two quantities involving one of the following relationships: less than, less than or equal to, greater than, greater than or equal to, or not equal.

Integer A number that is either a whole number or the negative of a whole number.

Integral Refers to an integer.

Intercepts The values where the graph of a relation crosses the axes.

Interquartile range The difference between the third and first quartiles.

Inverse of a function $f(x)$ is a function, $g(x)$ such that $f(g(x)) = x$ and $g(f(x)) = x$.

Inverse operations Subtraction is the inverse operation for addition. Division is the inverse operation for multiplication.

Irrational number A number that cannot be expressed as a quotient of two integers, e.g., $\sqrt{2}$. A number is irrational if and only if it cannot be written as a repeating or terminating decimal.

Landmark numbers Numbers that are familiar landing places that make for simple calculations and to which other numbers can be related such as 10, 100, and 1,000 and their multiples and factors.

Line graph A graph that connects data points.

Line of best fit A line drawn through, or near to, as many data points as possible on a scatterplot.

Line plot A number line with dots or other marks above it to show the number of times an event occurs.

Linear equation Any equation that can be written in the form $Ax + By + C = 0$ where A and B cannot both be 0. The graph of such an equation is a line.

Linear function A function of the form $f(x) = mx + b$ where m and b are some fixed numbers, representing slope and y-intercept. Functions of this kind are called "linear" because their graphs are lines.

Linear expression An expression of the form $ax + by + c$, $ax + by + cz + d$, where x, y, and z variable and a, b, c, and d are constants.

Linear pattern See arithmetic sequence.

Linear relationship A relationship involving only linear expressions.

Line of symmetry A line that divides a figure into two halves that are mirror images of each other.

Logarithm Another way to express an exponent. For example, since $10^2 = 100$ than $\log_{10} 100 = 2$.

Mean In statistics, the average obtained by dividing the sum of two or more quantities by the number of these values.

Measure of central tendency The mean, median, and mode of a set of data.

Median In statistics, the quantity designating the central value in a set of numbers. The center number (or the average of the two central numbers) of a list of data when the numbers are arranged in order from the least to greatest.

Mode In statistics, the value that occurs most frequently in a given set of numbers.

Monomial A product of numbers and/or variables, e.g., $5x^2$, $3x^2y$, $7x^3yz^2$.

Natural numbers The set of counting numbers.

Nested parentheses Grouping symbols within growing symbols, $[10(3+2)-12]$.

Net Two-dimensional pattern that can be folded to form a three-dimensional shape.

Nonstandard unit Unit of measurement expressed in terms of objects (such as paper clips, sticks of gum, shoes, etc.).

Numeral A symbol, not a variable, that is used to represent a number.

Numerical expressions An expression using only numerals.

Numeric pattern A pattern composed of numerals.

Obtuse angle An angle with a measurement greater than 90° and/or less than 180°.

Operational symbols Symbols used to indicate operations, such as + for addition, etc.

Order of operations Rules that describe the sequence used in evaluating expressions; that is, parenthesis, exponents, multiplication and division, addition and subtraction.

Ordered pair A pair of numbers that gives the coordinates of a point on a coordinate plane in this order – (horizontal coordinate, vertical coordinate).

Ordinal number A number designating the place (as first, second, or third) occupied by an item in an ordered sequence.

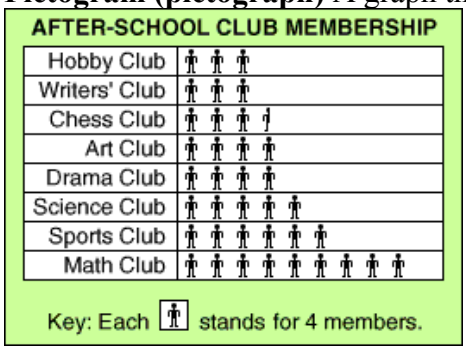
Parallel Given distinct lines in the plane that are infinite in both directions, the lines are parallel if they never meet.

Perimeter The distance around a plane, closed geometric figure.

Permutation A permutation is a specific reordering of a set of numbers {1, 2, ... , n}.

Perpendicular lines Two lines that intersect at right angles.

Pictogram (pictograph) A graph that uses pictures to show and compare information.



Plane A flat surface that extends indefinitely in all directions.

Polynomial In algebra, a sum of monomials; for example, $x^2 + 2xy + y^2$.

Prime Number A natural number greater than one is prime if and only if the only positive integer factors are one and the number itself. The first seven primes are 2, 3, 5, 7, 11, 13 and 17.

Probability A number from zero to one that describes the likelihood that a given event will take place. For example, the probability of throwing a six with a single throw of one die is 1/6.

Product The result of a multiplication.

Proof A method of constructing a valid argument, using deductive reasoning.

Proportion An equation that states that two ratios are equivalent, e.g., $\frac{4}{8} = \frac{1}{2}$ or $4:8 = 1:2$.

Pythagorean theorem For any right triangle, the sum of the squares of the measures of the legs equals the square of the measure of the hypotenuse, e.g., $a^2 + b^2 = c^2$ where a and b are the legs and c is the hypotenuse.

Quadrant One of the four regions into which the coordinate plane is divided.

Quadratic function A function containing x^2, a polynomial of degree 2 such as $f(x) = ax^2 + bx + c$.

Quartile The value of the boundary at the 25th, 50th, or 75th percentiles of a frequency distribution divided into four parts, each containing a quarter of the population.

Quotient The result of a division.

Random sample A group of people or objects chosen from a larger group or population by a process giving equal chance of selection to all possible people or objects.

Range In statistics, the difference between the greatest and smallest values in a data set.

Range of a function The set of possible values for y or $f(x)$.

Rate A ratio that compares two quantities measured in different units.

Ratio A quotient of two numbers or like quantities, e.g., 4 to 7 or 4 : 7 or $\frac{4}{7}$.

Rational number A number that can be written as the ratio of two integers, e.g., 0.5, $\frac{3}{5}$, -3, 8, $3\frac{9}{10}$.

Real number The set of numbers consisting of all rational and all irrational numbers.

Reflection A type of transformation that creates a mirror image of a figure on the opposite side of a line, called the line of symmetry.

Relation An equation that expresses the relationship between two variables.

Right angle An angle with a measurement of 90°.

Root A number that can be used as a factor a given number of times to produce the original number; for example, the fifth root of 32 = 2 because $2^5 = 32$.

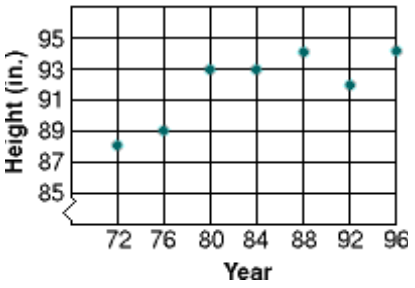
Root of an equation A value that makes the equation true.

Rotation A type of transformation that turns a figure about a fixed point, called the center of rotation.

Sample space In probability, the set of all possible outcomes of a given experiment, e.g., the sample space for tossing two coins is {(H,H), (H,T), (T,H), (T,T)}.

Scalene triangle A triangle with three unequal sides.

Scatterplot Two sets of data plotted as ordered pairs in the coordinate plane.



Scientific notation A system in which numbers are expressed as products consisting of a number from one to ten multiplied by an appropriate power of ten, e.g., $562 = 5.62 \times 10^2$.

Sequence A set of elements that can be counted, e.g., 1, 3, 9, 27, 81. In this sequence, 1 is the first term, 3 is the second term, 9 is the third term, and so on.

Similarity Having the same shape but not necessarily the same size.

Sine The sine of an angle θ ($\sin \theta$) is the *y*-coordinate of the point on the unit circle so that the ray connecting the origin to the point makes an angle of θ with the positive *x*-axis. When θ is an angle of a right triangle, then $\sin(\theta)$ is the ratio of the opposite side with the hypotenuse.

Single variable equation An equation with one variable.

Square number The product when a whole number is multiplied by itself.

Square root A number *n* is a root of a number *m* if $n^2 = m$. The square root of 16 is 4 or -4.

Standard deviation A statistic that measures the dispersion of a sample.

Sum The result of addition.

Symmetry A figure has symmetry when one side is the mirror image of the other side.

System of linear equations Two or more linear equations used to describe a situation.

Tangent A line, curve, or surface meeting another line, curve, or surface at a single point and sharing a common tangent line or tangent plane at that point. The tangent of an

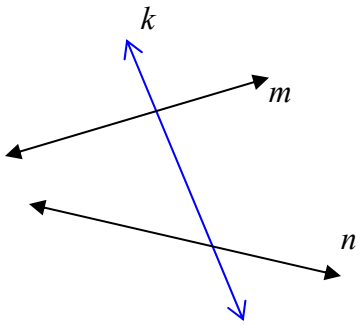
angle θ, $tan\,\theta$, is the ratio of $sin\ \theta$ to $cos\,\theta$. In a right triangle, $tan\ \theta$ is the ratio of the opposite side length to the adjacent side length.

Tessellation A repetitive pattern of polygons that fit together with no gaps or overlaps.

Transformation A rule that sets up a one-to-one correspondence between the points in a geometric object (the preimage) and the points in another geometric object (the image). Reflections, rotations, translations, and dilations are particular examples of transformations.

Translation Sliding a figure from one position to another without turning or flipping the figure.

Transversal In geometry, a line (*k*) that intersects two or more lines (*m* and *n*) at different points.

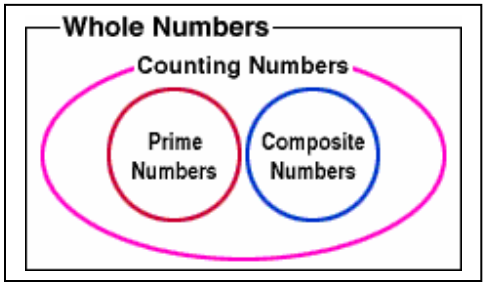


Unit fraction A fraction whose numerator is 1 (e.g., $\frac{1}{3}, \frac{1}{2}, \frac{1}{5}$).

Unit rate A rate with a denominator of one.

Variable A letter or symbol used to represent one or more numbers in an expression, equation, inequality, or matrix.

Venn diagram A diagram that is used to show relationships between sets.



Vertex A point of intersection of lines, rays, or segments, in a plane or of faces of a solid (corner).

Volume The number of cubic units needed to fill the space occupied by a solid.

Whole number A number that is either a counting number or zero.

Zeros of a function The points at which the value of a function is zero.

Glossary Sources

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